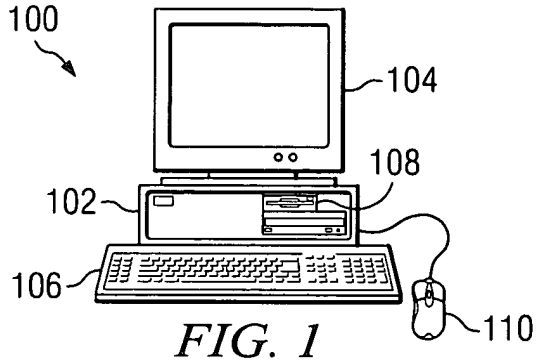


FIG. 1

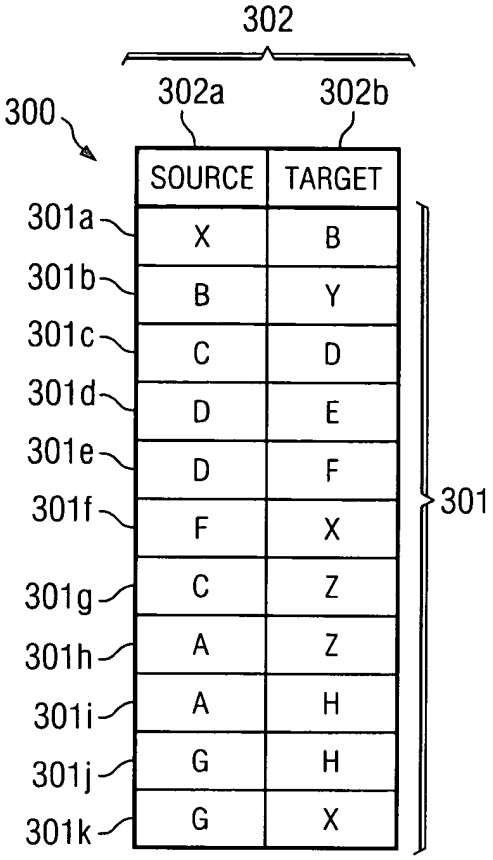


FIG. 3

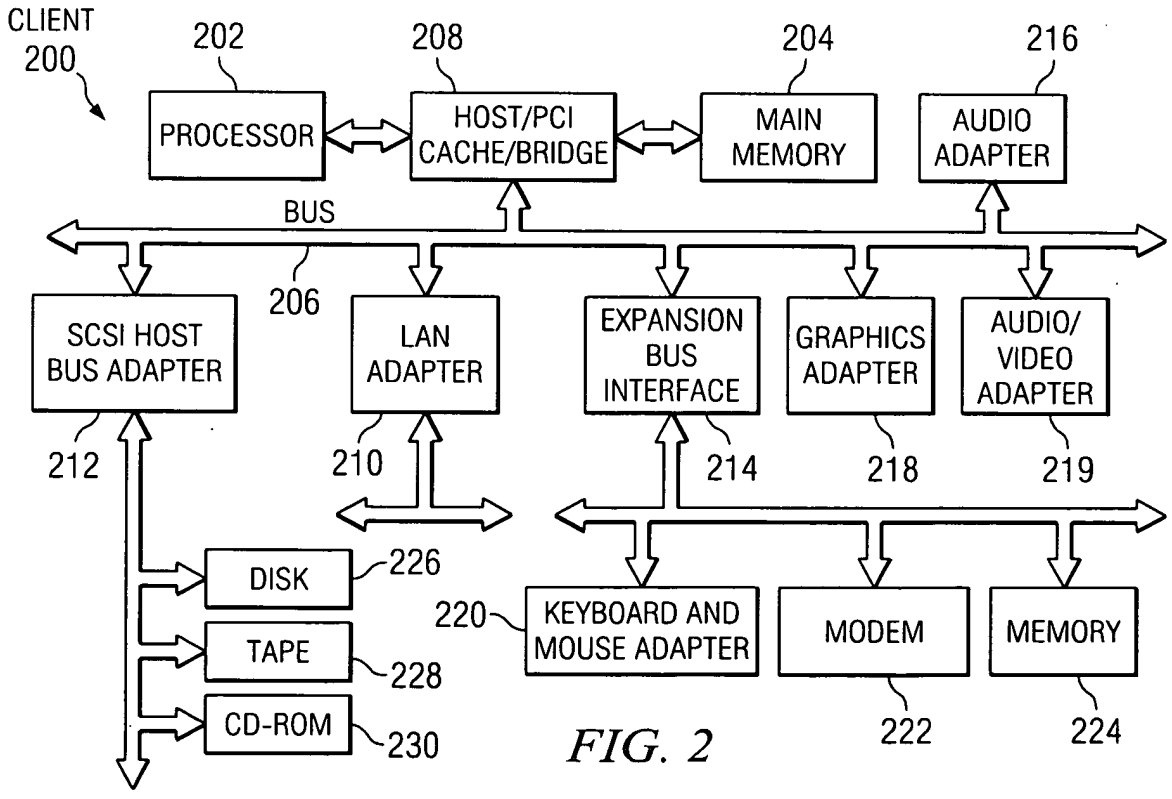


FIG. 2

FIG. 4

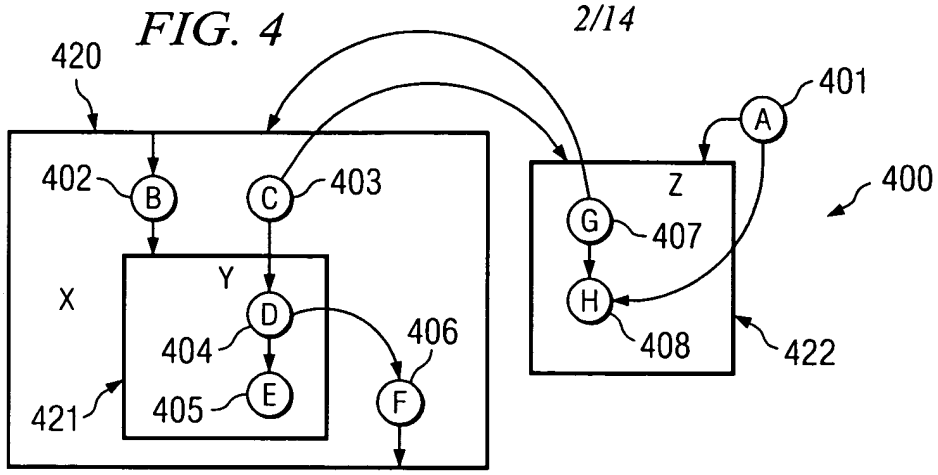
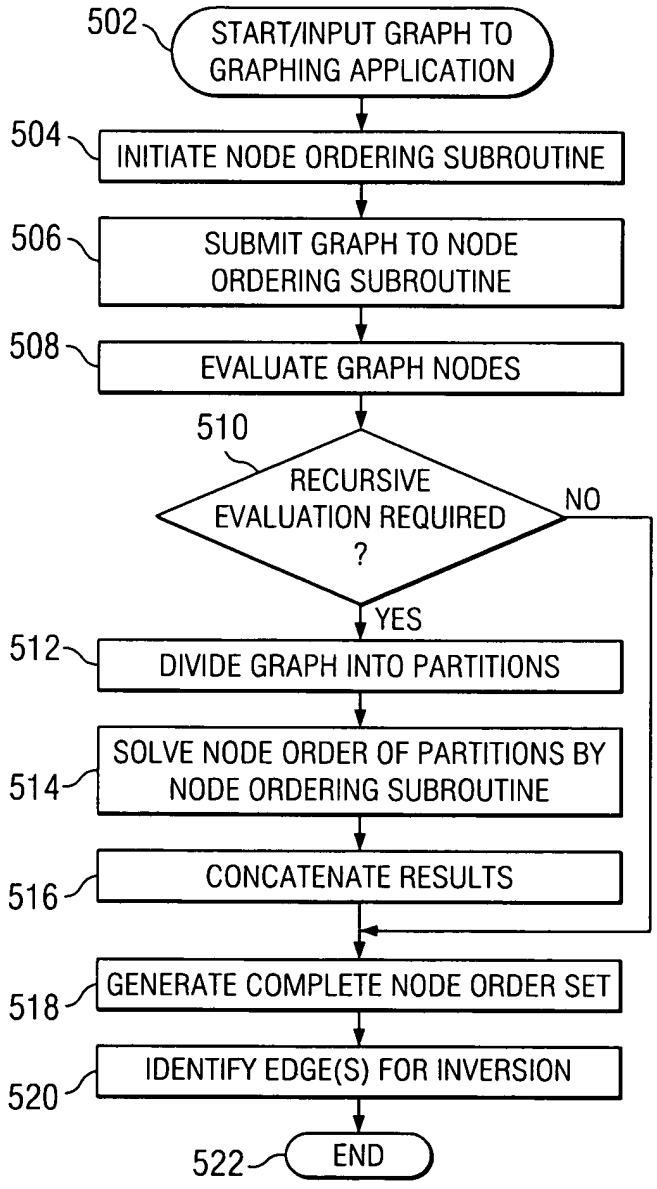

420
401
A
402
B
C
403
Z
400
G
407
Y
X
D
H
406
404
408
422
421
405
E
F

FIG. 5A


502
START/INPUT GRAPH TO GRAPHING APPLICATION
504
INITIATE NODE ORDERING SUBROUTINE
506
SUBMIT GRAPH TO NODE ORDERING SUBROUTINE
508
EVALUATE GRAPH NODES
510
RECURSIVE EVALUATION REQUIRED ?
NO
YES
512
DIVIDE GRAPH INTO PARTITIONS
514
SOLVE NODE ORDER OF PARTITIONS BY NODE ORDERING SUBROUTINE
516
CONCATENATE RESULTS
518
GENERATE COMPLETE NODE ORDER SET
520
IDENTIFY EDGE(S) FOR INVERSION
522
END

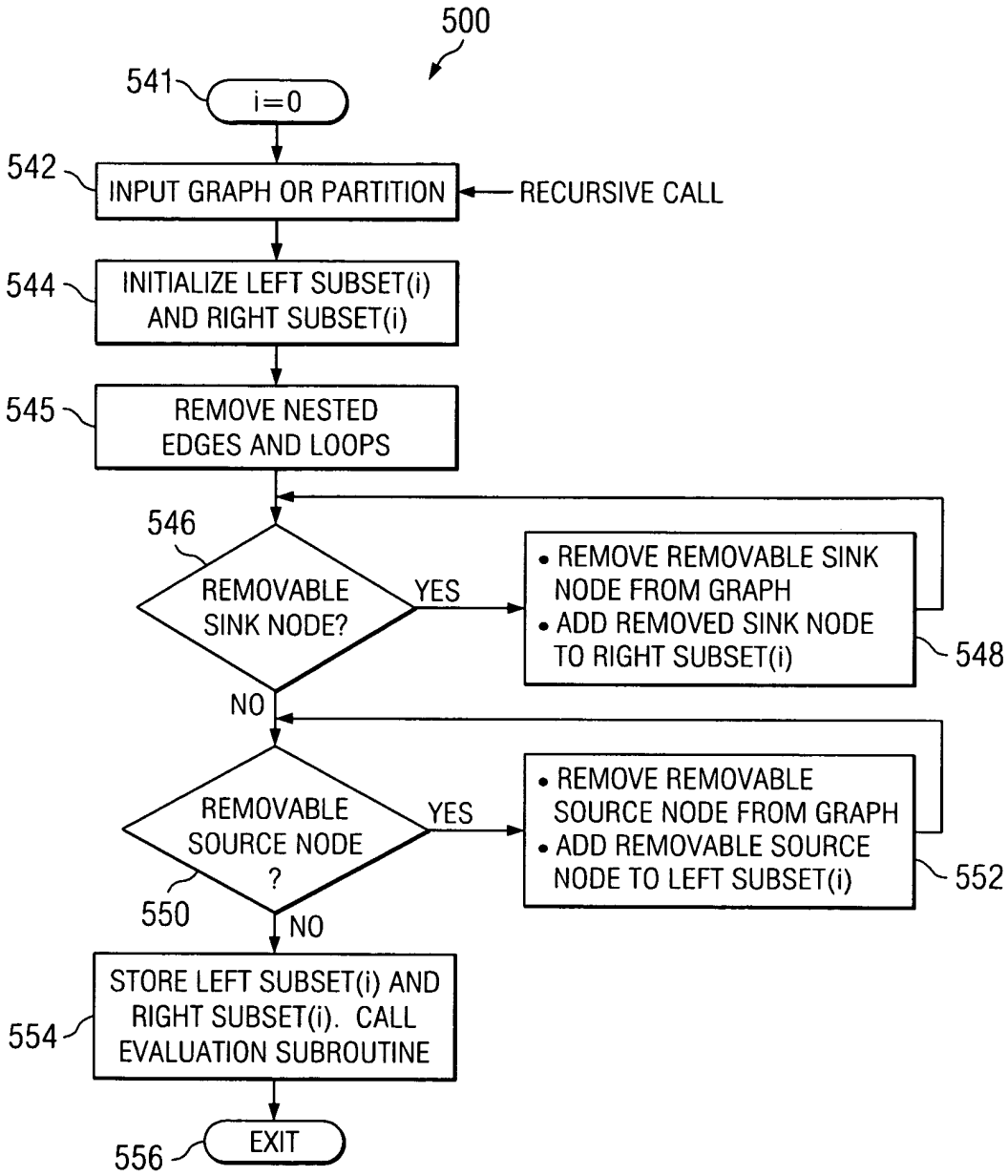

500
541
i=0
542
INPUT GRAPH OR PARTITION
RECURSIVE CALL
544
INITIALIZE LEFT SUBSET(i)
AND RIGHT SUBSET(i)
545
REMOVE NESTED
EDGES AND LOOPS
546
REMOVABLE
SINK NODE?
YES
• REMOVE REMOVABLE SINK
NODE FROM GRAPH
• ADD REMOVED SINK NODE
TO RIGHT SUBSET(i)
548
NO
REMOVABLE
SOURCE NODE
?
YES
• REMOVE REMOVABLE
SOURCE NODE FROM GRAPH
• ADD REMOVABLE SOURCE
NODE TO LEFT SUBSET(i)
552
550
NO
STORE LEFT SUBSET(i) AND
RIGHT SUBSET(i). CALL
EVALUATION SUBROUTINE
554
EXIT
556

FIG. 5B

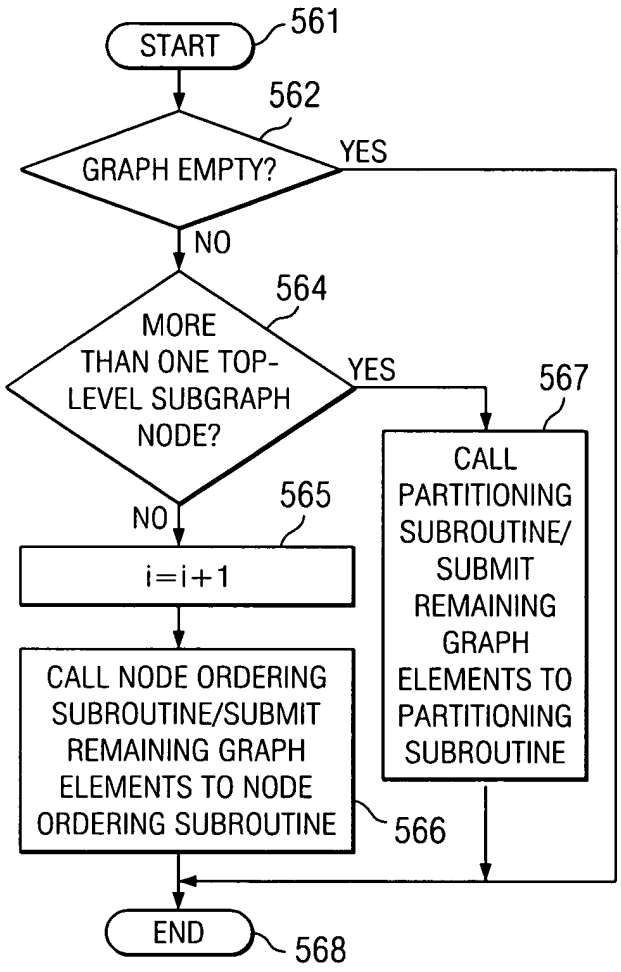

START
561
562
GRAPH EMPTY?
YES
NO
564
MORE THAN ONE TOP-LEVEL SUBGRAPH NODE?
YES
567
NO
565
i=i+1
CALL NODE ORDERING SUBROUTINE/SUBMIT REMAINING GRAPH ELEMENTS TO NODE ORDERING SUBROUTINE
566
CALL PARTITIONING SUBROUTINE/ SUBMIT REMAINING GRAPH ELEMENTS TO PARTITIONING SUBROUTINE
END
568

FIG. 5C

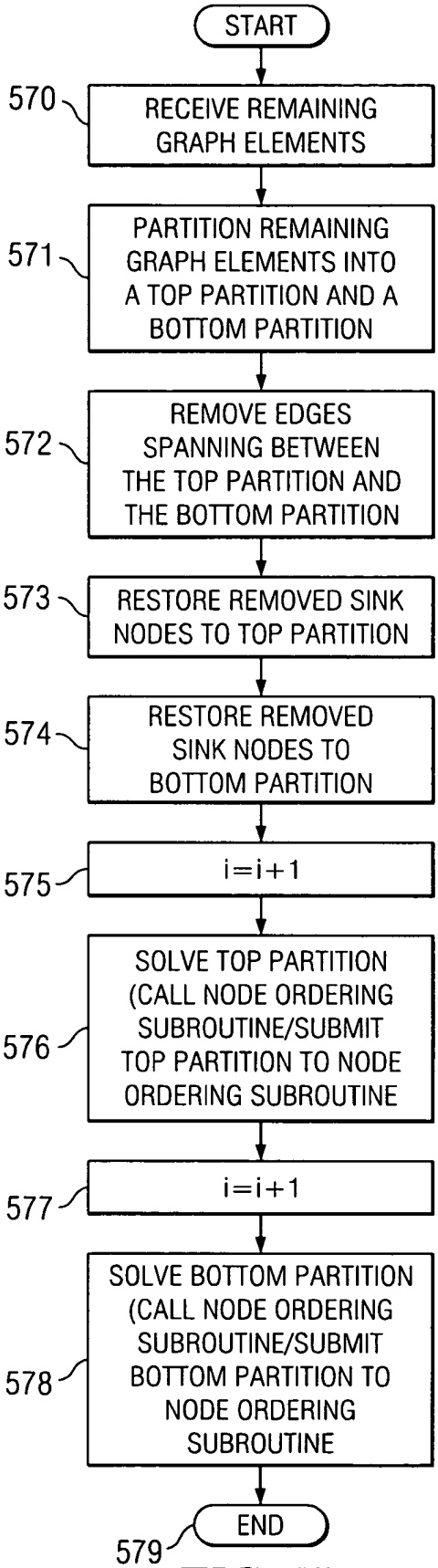

START
570
RECEIVE REMAINING GRAPH ELEMENTS
571
PARTITION REMAINING GRAPH ELEMENTS INTO A TOP PARTITION AND A BOTTOM PARTITION
572
REMOVE EDGES SPANNING BETWEEN THE TOP PARTITION AND THE BOTTOM PARTITION
573
RESTORE REMOVED SINK NODES TO TOP PARTITION
574
RESTORE REMOVED SINK NODES TO BOTTOM PARTITION
575
i=i+1
576
SOLVE TOP PARTITION (CALL NODE ORDERING SUBROUTINE/SUBMIT TOP PARTITION TO NODE ORDERING SUBROUTINE
577
i=i+1
578
SOLVE BOTTOM PARTITION (CALL NODE ORDERING SUBROUTINE/SUBMIT BOTTOM PARTITION TO NODE ORDERING SUBROUTINE
579
END

FIG. 5D

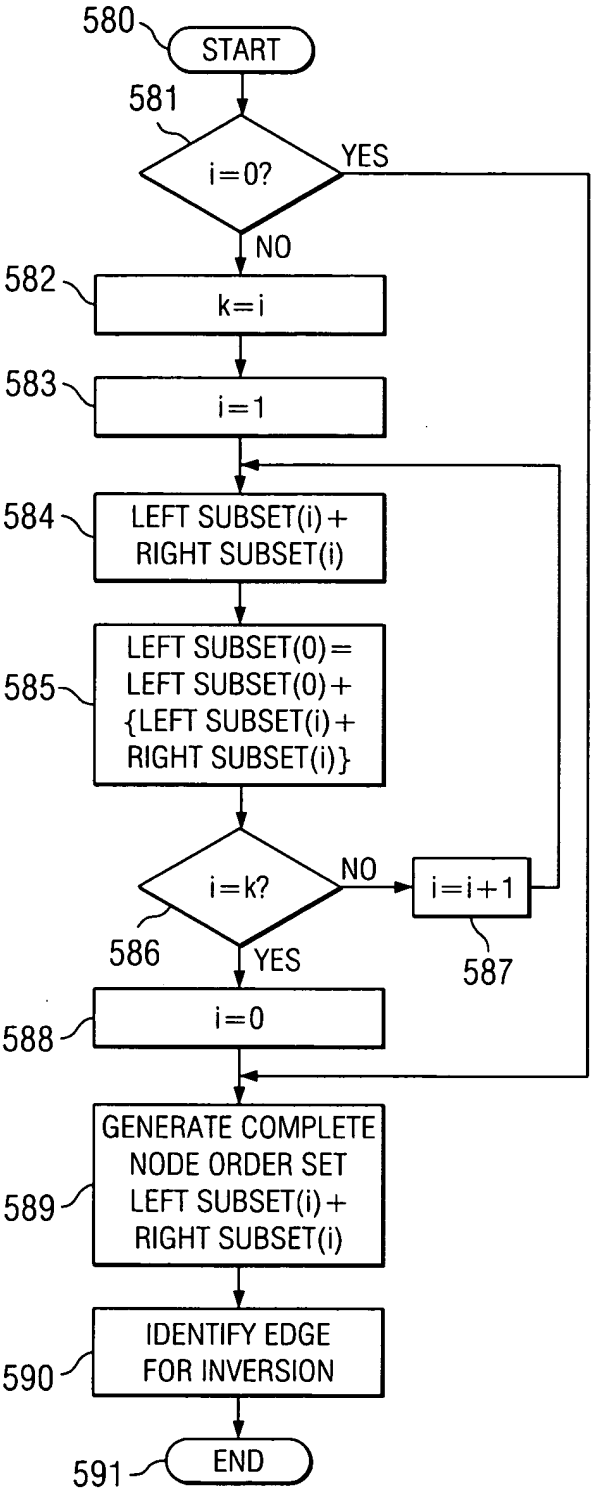

580
START
581
i=0?
YES
NO
582
k=i
583
i=1
584
LEFT SUBSET(i)+
RIGHT SUBSET(i)
585
LEFT SUBSET(0)=
LEFT SUBSET(0)+
{LEFT SUBSET(i)+
RIGHT SUBSET(i)}
i=k?
NO
i=i+1
586
YES
587
588
i=0
589
GENERATE COMPLETE
NODE ORDER SET
LEFT SUBSET(i)+
RIGHT SUBSET(i)
590
IDENTIFY EDGE
FOR INVERSION
591
END

FIG. 5E

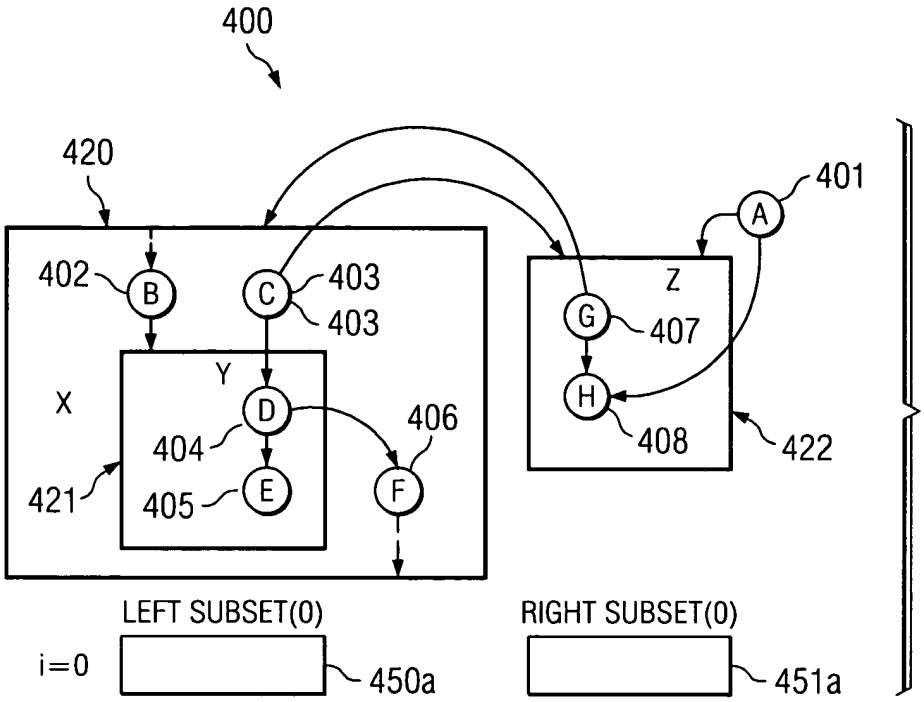

400
420
401
402
B
C
403
403
A
Z
G
407
Y
X
D
406
H
404
408
422
421
405
E
F
LEFT SUBSET(0)
RIGHT SUBSET(0)
i=0
450a
451a

FIG. 6A

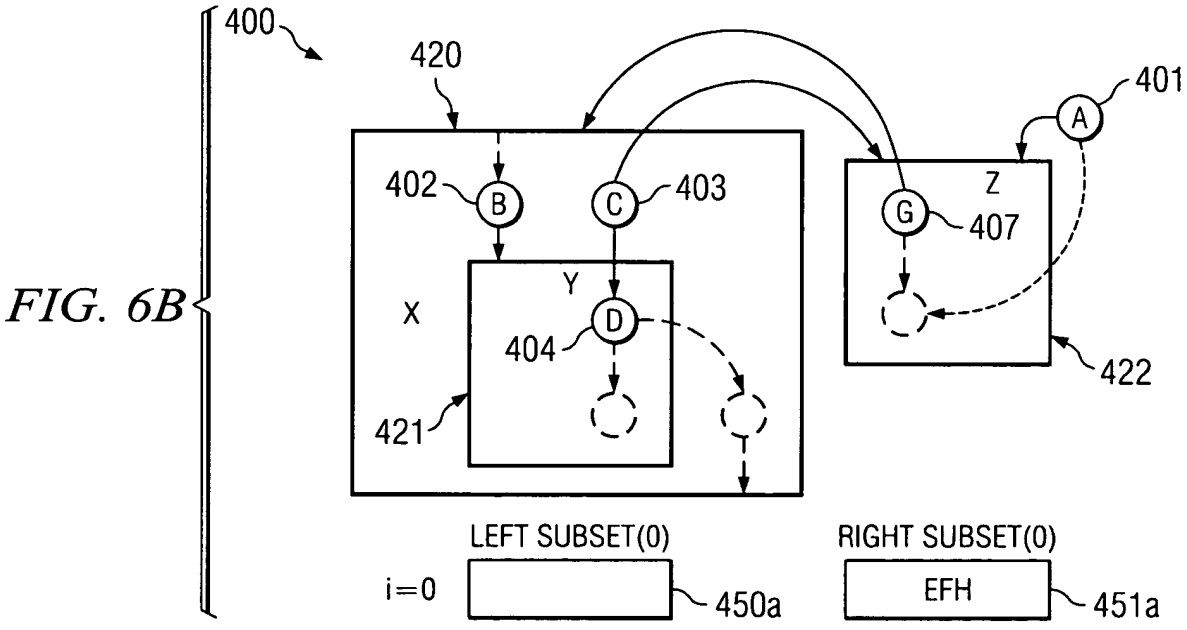

400
420
401
402
B
C
403
A
Z
G
407
Y
X
D
404
422
421
LEFT SUBSET(0)
RIGHT SUBSET(0)
i=0
EFH
450a
451a

FIG. 6B

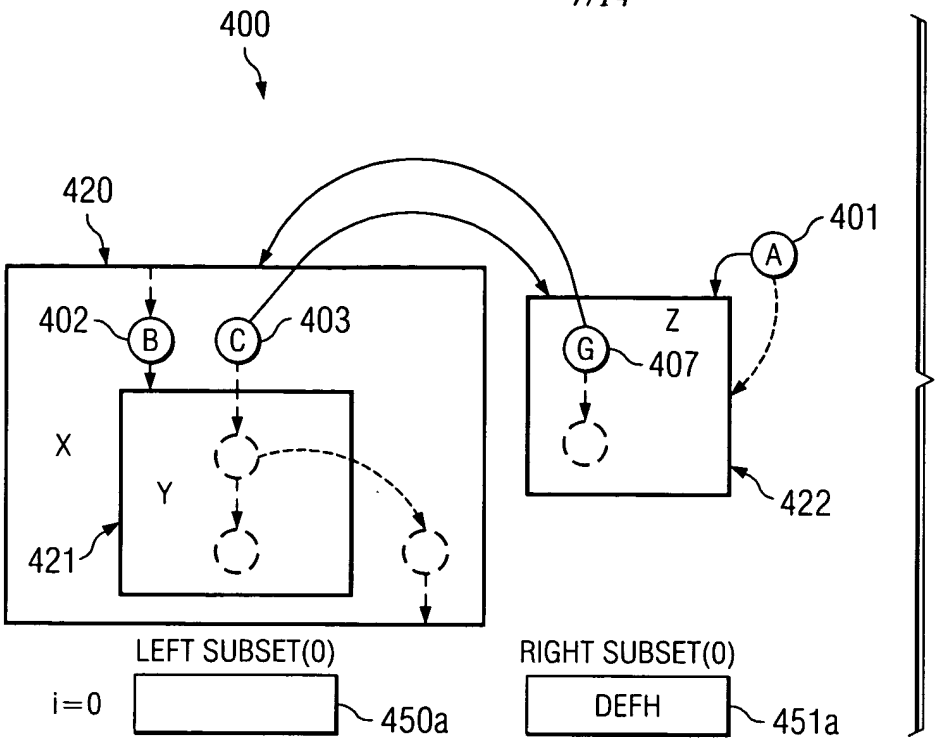

400
420
401
A
402
B
C
403
Z
G
407
X
Y
421
422
LEFT SUBSET(0)
RIGHT SUBSET(0)
i=0
450a
DEFH
451a

FIG. 6C

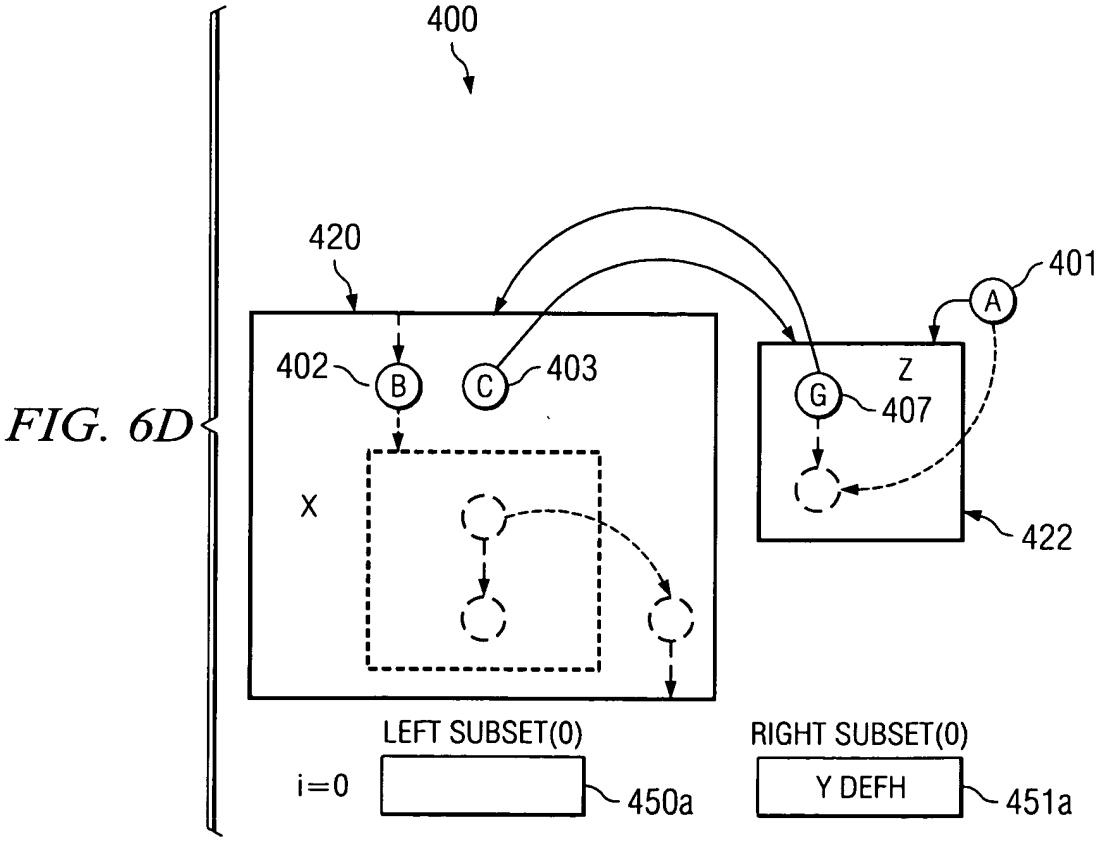

400
420
401
A
402
B
C
403
Z
G
407
X
422
LEFT SUBSET(0)
RIGHT SUBSET(0)
i=0
450a
Y DEFH
451a

FIG. 6D

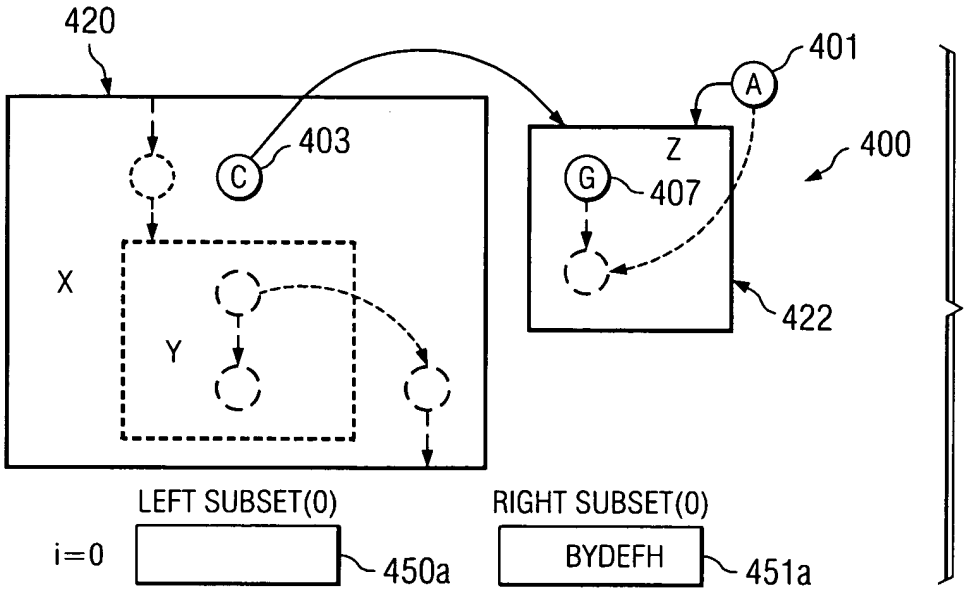

420
401
A
403
C
Z
G
407
400
X
Y
422
LEFT SUBSET(0)
RIGHT SUBSET(0)
i=0
450a
BYDEFH
451a

FIG. 6E

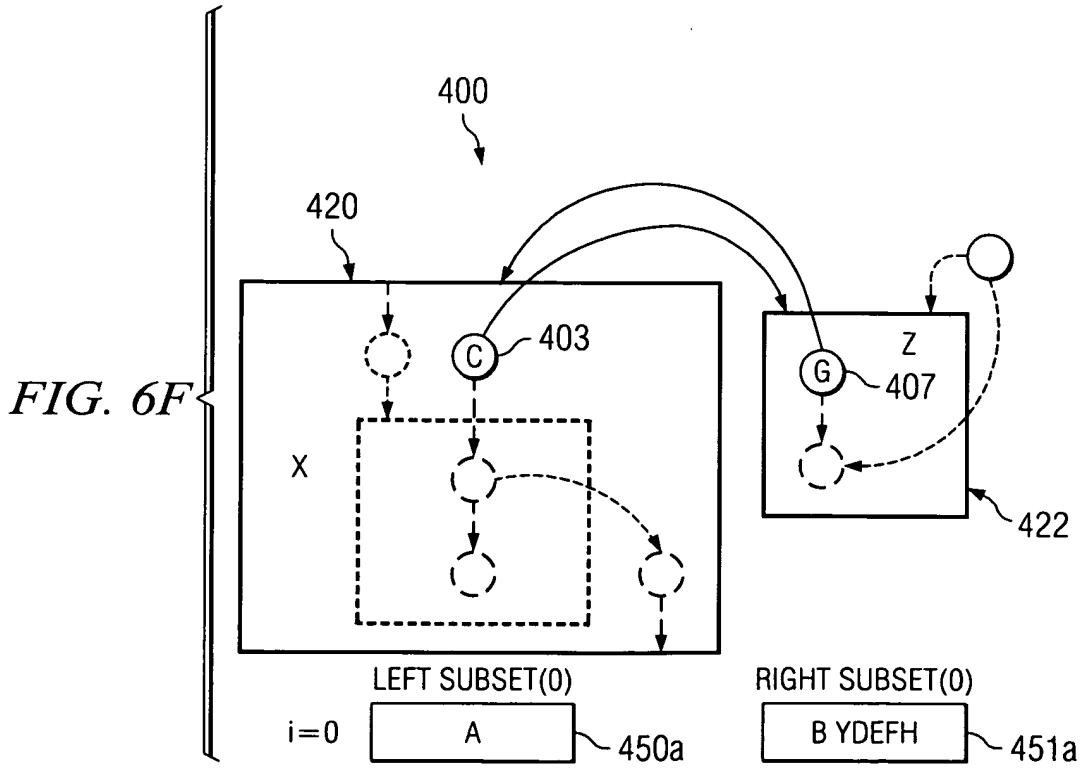

400
420
403
C
Z
G
407
X
422
LEFT SUBSET(0)
RIGHT SUBSET(0)
i=0
A
450a
B YDEFH
451a

FIG. 6F

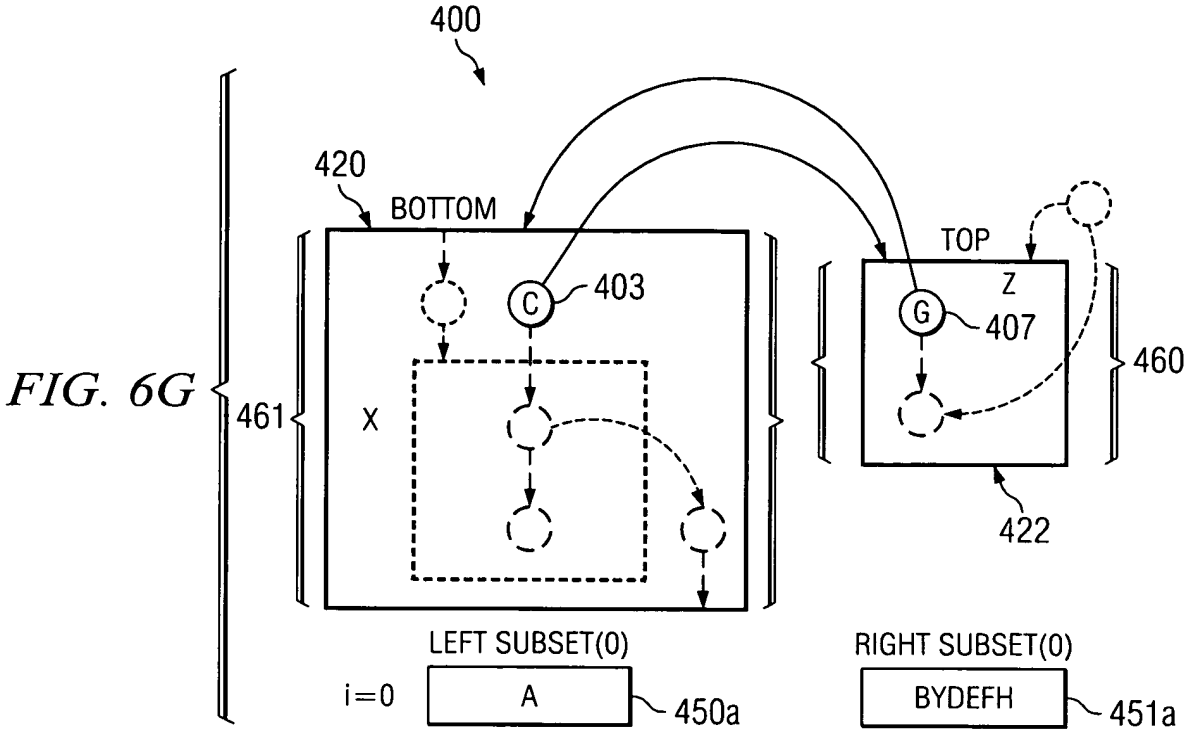

400
420
BOTTOM
TOP
Z
C
403
G
407
460
461
X
422
LEFT SUBSET(0)
RIGHT SUBSET(0)
i=0
A
450a
BYDEFH
451a

FIG. 6G

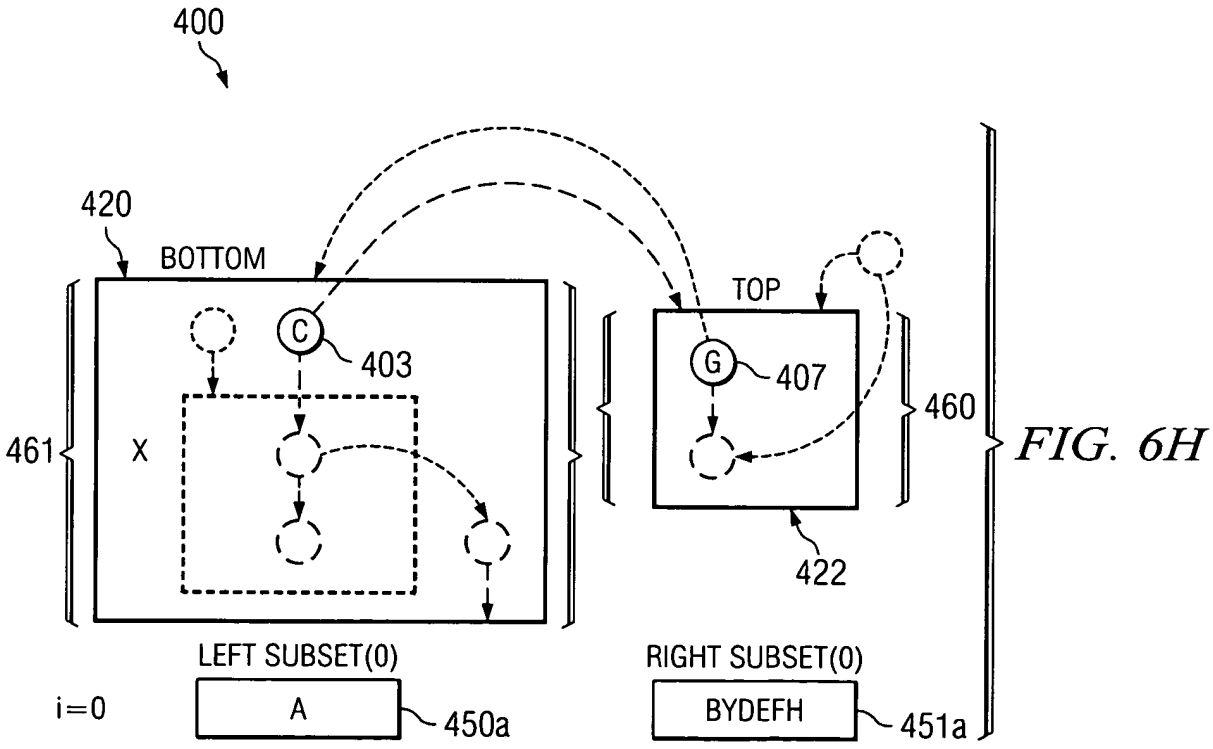

400
420
BOTTOM
TOP
C
403
G
407
460
461
X
422
LEFT SUBSET(0)
RIGHT SUBSET(0)
i=0
A
450a
BYDEFH
451a

FIG. 6H

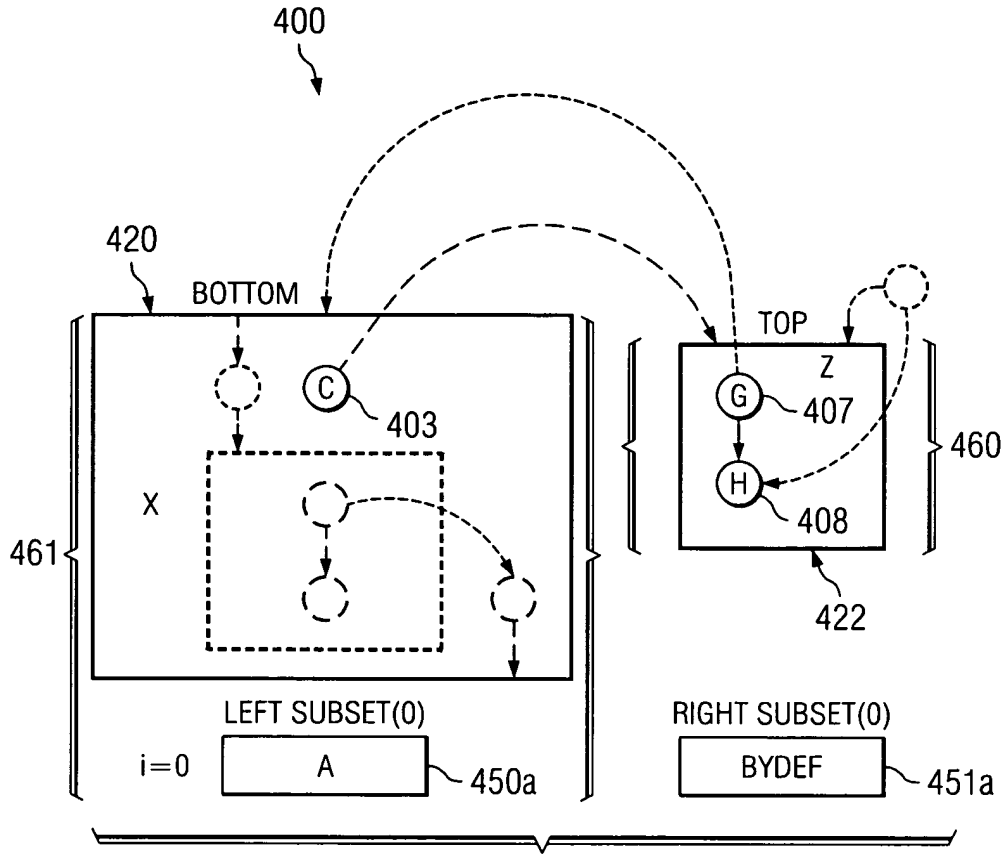


FIG. 6I

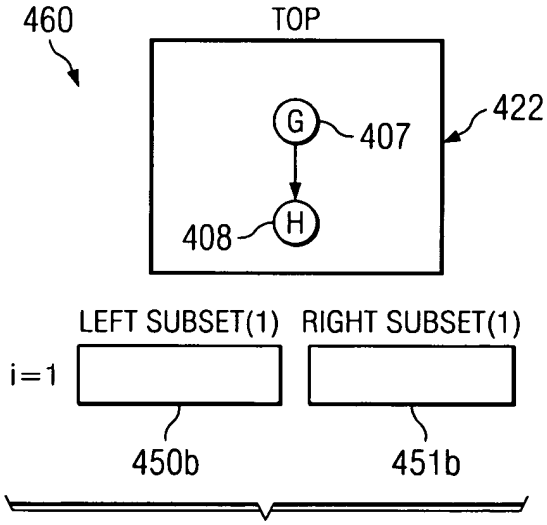


FIG. 6J

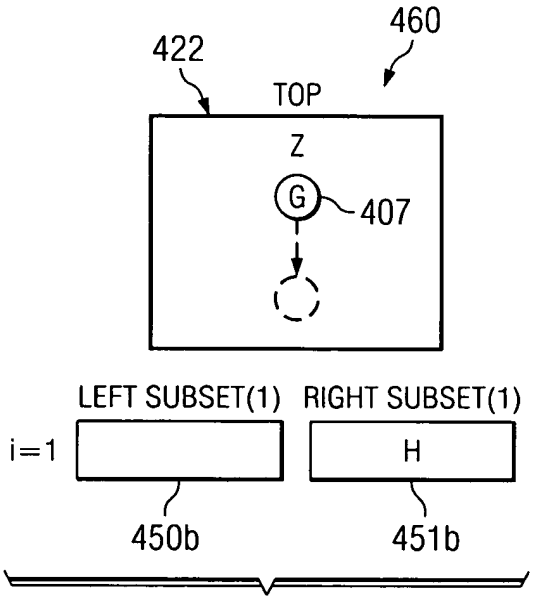


FIG. 6K

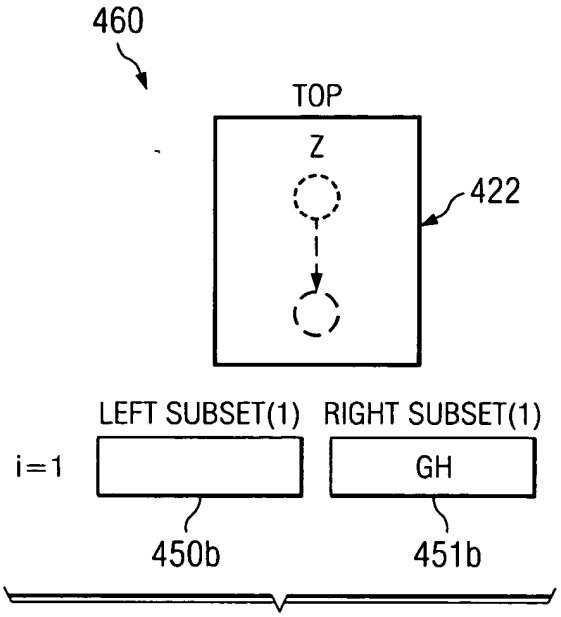


FIG. 6L

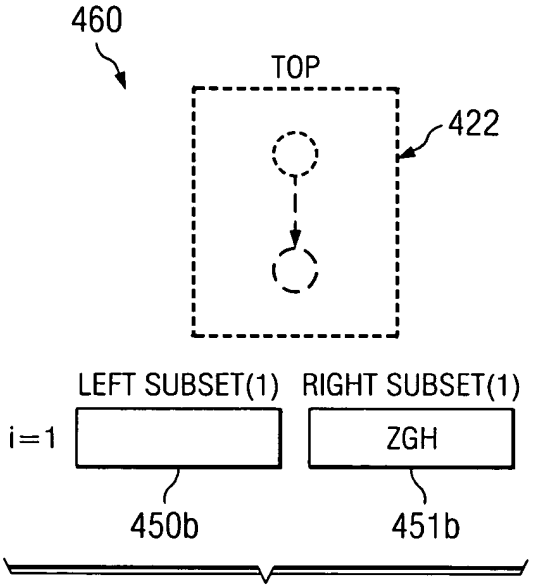
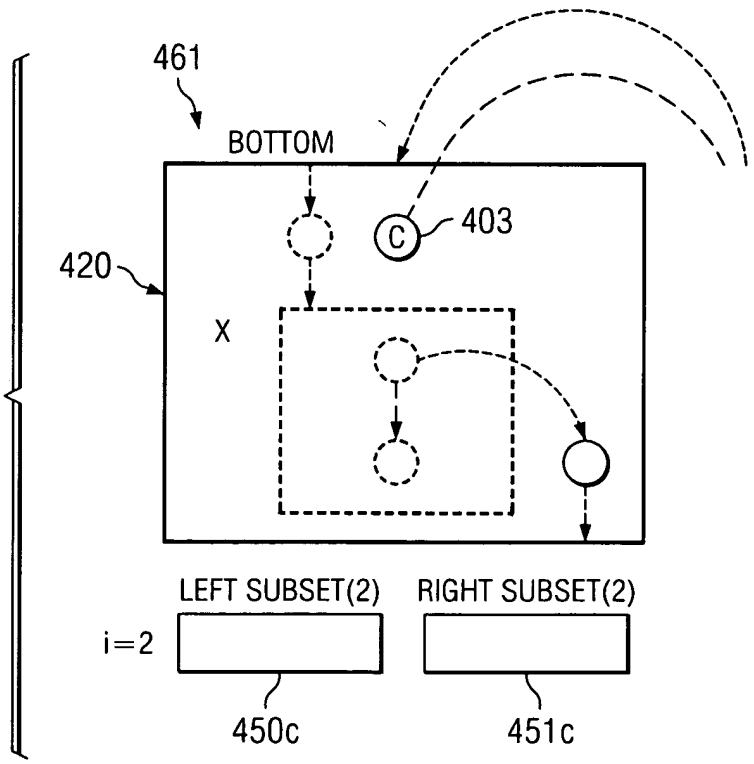


FIG. 6M

FIG. 6N



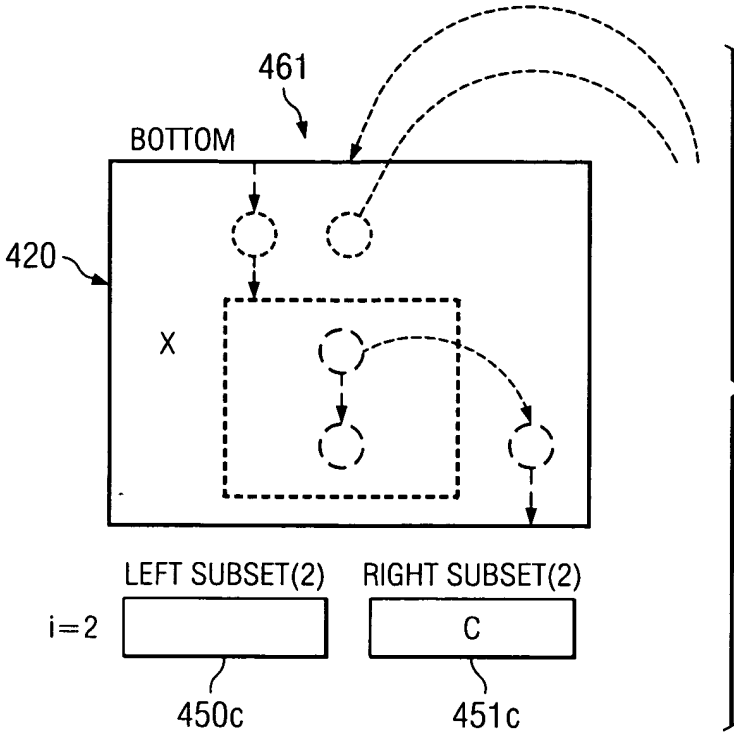

461
BOTTOM
420
X
LEFT SUBSET(2)
RIGHT SUBSET(2)
i=2
C
450c
451c

FIG. 6O

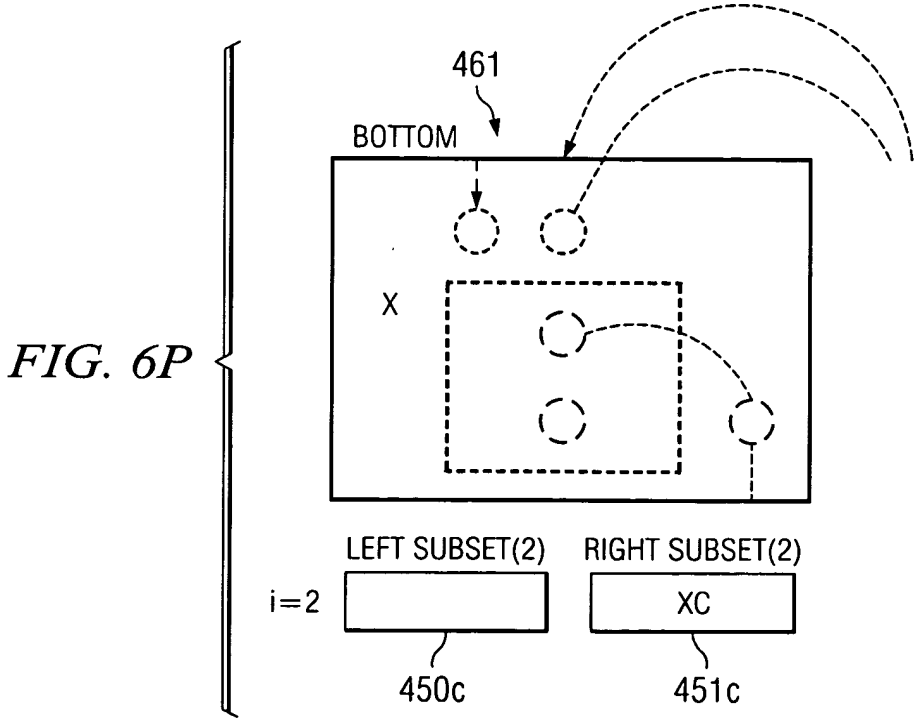

461
BOTTOM
X
LEFT SUBSET(2)
RIGHT SUBSET(2)
i=2
XC
450c
451c

FIG. 6P

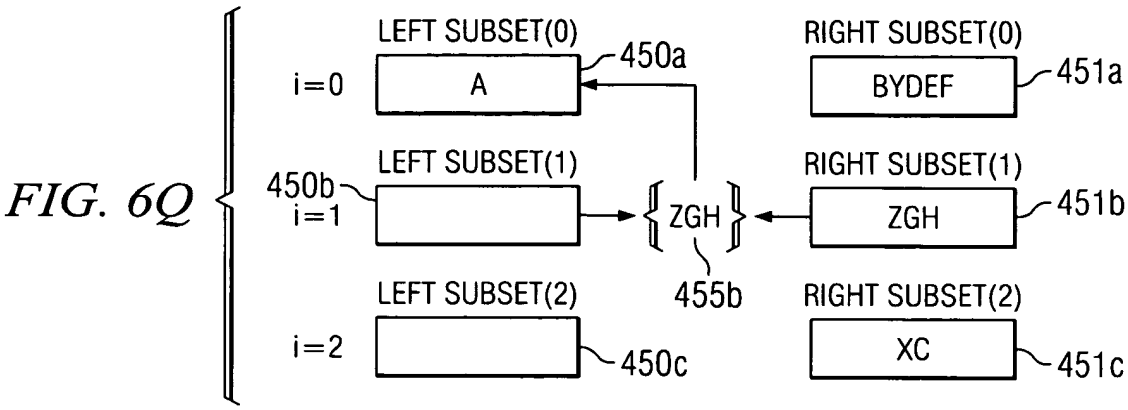


FIG. 6Q

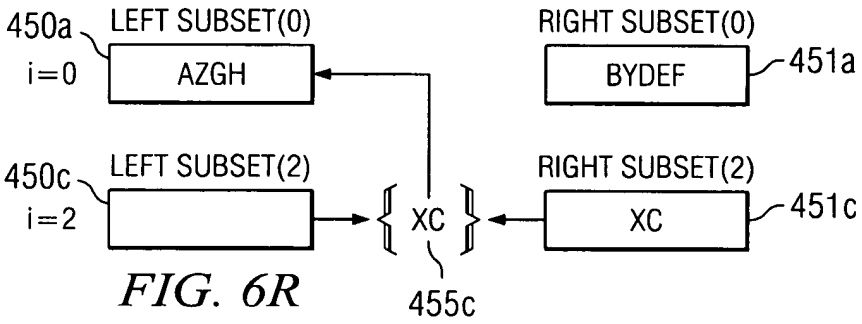


FIG. 6R

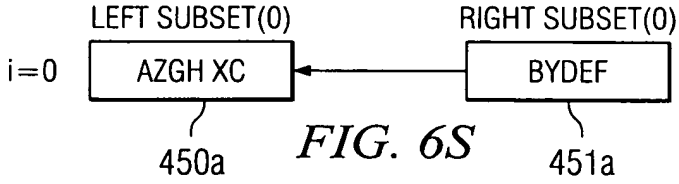


FIG. 6S

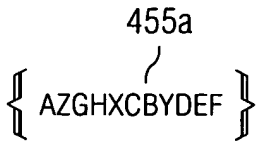


FIG. 6T

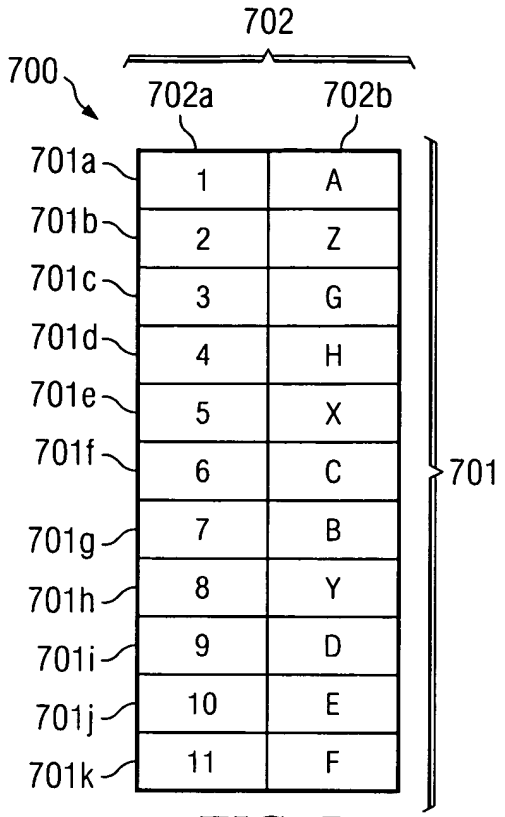


FIG. 7

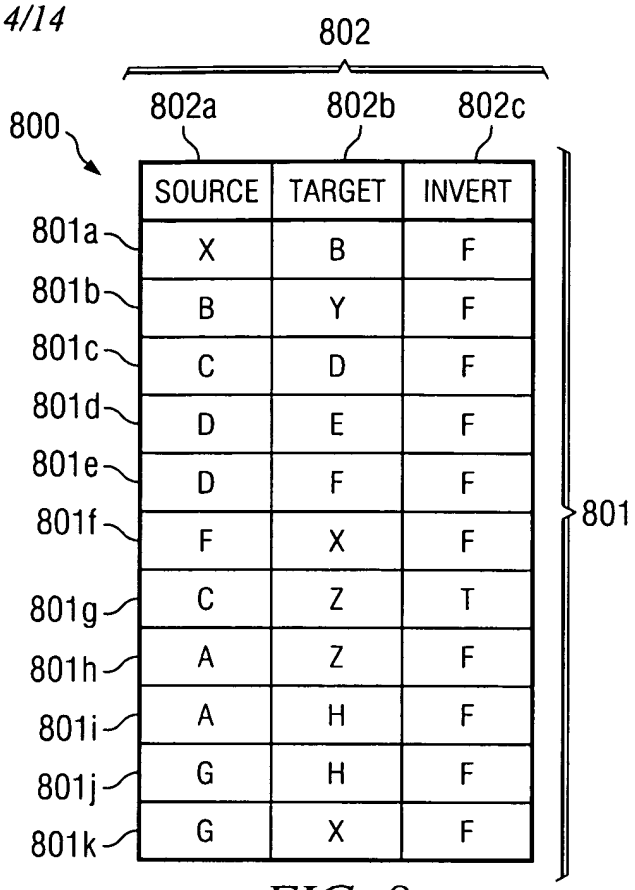


FIG. 8

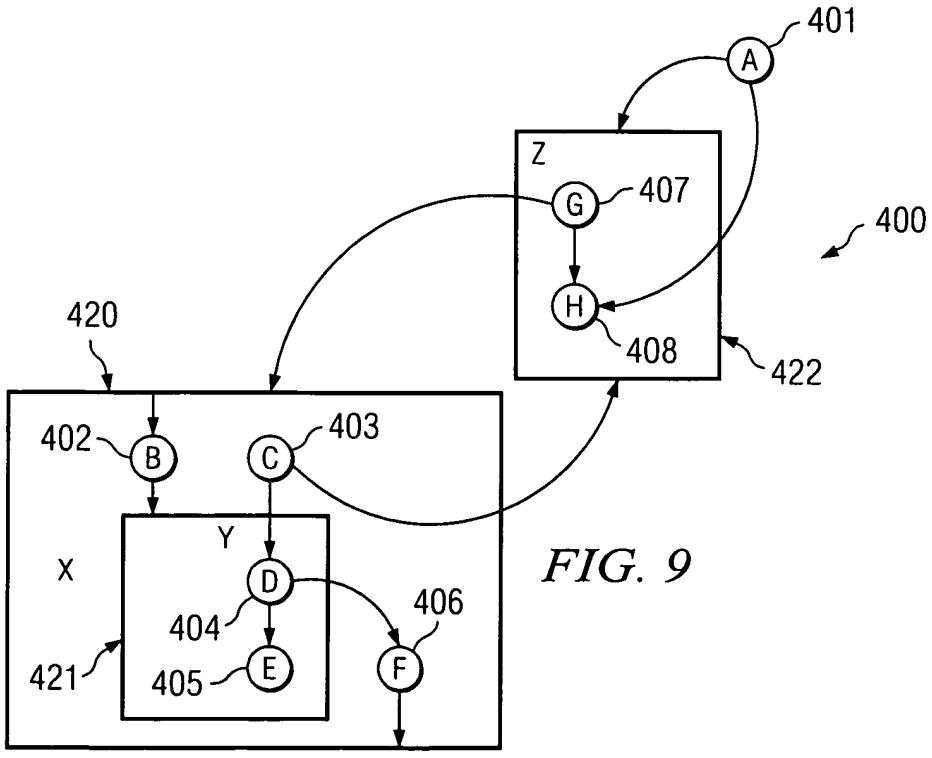


FIG. 9